



Wireless Transceivers for Fuel Level Sensors

RUd-DF-232

RUd-DF-485

Instruction Manual

Version # 2.1

VTAS.421451.001 IM

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1. INTRODUCTION

This Instruction manual is intended to learn the product's purpose, the structure, the operating principle, characteristics and rules of operation of wireless transceivers **RUd-DF-232** and **RUd-DF-485** (hereinafter referred to as a product).

The product consists of two parts (hereinafter referred to as a radio signal transmitter and radio signal receiver).

2. DESCRIPTION AND OPERATION

2.1 Product's purpose

Wireless transceiver is designed for reading digital data and measuring the frequency of the output signal from the fuel level sensor, transmitting the result wirelessly, repeating the read data and the frequency of the signal at the receiving end.

Note: for a signal from the sensor, having the discrete output, the frequency measurement input (at the radio signal transmitter) can be tuned to measure the level of a discrete signal. Respectively, the frequency output (at the radio signal receiver) can be tuned to transmit the level of a digital signal.

In addition, by special order, an extra channel can be added to the product to transmit the level of a discrete signal from an extra sensor.

2.2 Specifications

Wireless transceiver has the strength to the effects of mechanical shock of repeated action and the strength in transportation, in accordance with the requirements set for devices in section 5 of GOST 22261-94.

Terms of use	
Operating temperature range	- 40 to +60 °C
Relative humidity of ambient air	30 to 80 %
Atmospheric pressure	84 to 106,7 kPa

Basic technical characteristics		
1	Supply voltage	8 to 39 V DC
	Power consumption of the signal receiver , not more than	0,01 W
	Power consumption of the signal transmitter , not more than	0,02 W
2	Parameters of the input for frequency measurement Input «F» (for radio signal transmitter) . Type of input – Grounding.	
	Frequency, min	1 Hz
	Frequency, max	3000 Hz
	Current (at a supply voltage 12 V), not more than	16 mA
	Current (at a supply voltage 24 V), not more than	32 mA
	Frequency measurement time	1 to 10 sec.
3	Parameters of the input for a discrete signal level Input «E» (for a radio signal transmitter). Type of input – Grounding.	
	Current (at a supply voltage 12 V), not more than	16 mA
	Current (at a supply voltage 24 V 24), not more than	32 mA
4	Parameters of the frequency output OUTPUT «F» (for a radio signal receiver). Type of output – Grounding	
	Frequency, min	1 Hz
	Frequency, max	3000 Hz
	Signal form	meander
	Voltage, max	100 V
5	Parameters of the output for transmission of a discrete signal level OUTPUT «E» (for a radio signal receiver). Type of output – Grounding	
	Voltage, max	100 V
	Current, max	100 mA
6	Interface parameters of RS232 (RS485)	
	Data transfer rate	300, 600, 1200, 2400, 4800, 9600, 19200, 38400, 57600, 115200 bps

Basic technical characteristics (continued)		
Wireless parameters		
7	Radio signal frequency	868 MHz
	Communication range in open space, not less	30 m
	The range of addresses to identify devices on wireless	0 to 65534
Other parameters		
8	Mean time between failures in operating conditions, not less than	30000 hours
	The average total life cycle, not less than	6 years
	The degree of protection of a receiver and a transmitter against external influences	IP67 GOST 14254-96
	Overall dimensions	83x57x25 mm
	Mass	0,15 kg

2.3 Composition of the product

RUd-DF-232		
№	Name	Number of pieces
1	Radio signal transmitter RUd-DF-232 with 2-meter installation cable	1
2	Radio signal receiver RUd-DF-232 with 2-meter installation cable	1
3	Packaging	1
4	Certificate	1

RUd-DF-485		
№	Name	Number of pieces
1	Radio signal transmitter RUd-DF-485 with 2-meter installation cable	1
2	Radio signal receiver RUd-DF-485 with 2-meter installation cable	1
3	Packaging	1
4	Certificate	1

2.4 Design and Operation

The product consists of a radio signal transmitter and a radio signal receiver. Both the transmitter and receiver are made in a sealed plastic case and have installation cable (2 meters) in their composition for connections of power, digital interfaces, inputs and outputs. Exterior view of the product is shown in Attachment 1.

The availability of digital interfaces, Inputs / Outputs depending on the modification of the product and its parts is given in Table.

Product Modification	Part of the product	Availability of digital interfaces, inputs , outputs				
		Input for frequency measurement	Frequency output	RS-232	RS-485	Additional digital input / output
RUd-DF-232	Transmitter RUd-DF-232	+		+		Special order
	Receiver RUd-DF-232		+	+		
RUd-DF-485	Transmitter RUd-DF-485	+			+	
	Receiver RUd-DF-485		+		+	

Transmission of digital data.

A fuel level sensor with digital interface is connected to the interface circuits of the radio signal transmitter. The radio signal receiver is connected to an external device (terminal device, computer, etc. for processing data from the sensor. In this case, both a receiver and a transmitter are the translators of information, ie RS-232(485) transmitter receives digital data from a sensor and transmits them as a radio signal to a receiver and the receiver transmits these data via RS-232(485).

Similarly, when requesting a fuel level sensor, the request is received by a receiver via RS-232(485), is transmitted as a radio signal to a transmitter, the transmitter passes the request to the sensor via RS-232(485).

The rate of exchange on the RS-232(485) interface is set by the program «RUD Configurator».

Frequency measurement and transmission.

A fuel level sensor with a frequency output is connected to the frequency measurement input of the radio signal transmitter (Input «F»). The radio signal receiver is connected to an external device (terminal device, computer, etc.) to measure the frequency from the sensor.

The result of the frequency measurement is transmitted as a radio signal to a receiver, which forms, at the frequency output (OUTPUT «F»), a signal with the frequency equal to the frequency of the signal from the sensor. The accuracy of frequency measurement depends on the duration of measurement. The larger the measurement time, the higher the accuracy.

Measurement time is set by the program «RUD Configurator».

Periodicity of data transmission by a radio transmitter – 1 second.

To transmit a signal from the sensor, having a discrete output, the frequency measurement input (at the radio signal transmitter) can be tuned to measure the discrete signal level. Respectively, the frequency output (at the radio signal receiver) can be tuned to transfer the digital signal level.

Measurement and transmission of a discrete signal.

An additional sensor with a discrete output is connected to the discrete signal input of a transmitter (Input «E»). A radio signal receiver is connected to an external device (terminal device, computer, etc.) to process data from the sensor.

The result of measuring of the discrete signal level is transmitted as a radio signal to a receiver, which forms at his corresponding output (OUTPUT «E») the signal with a level corresponding to the level at the transmitter input.

Periodicity of data transmission by a radio transmitter – 1 second.

Identification of wireless devices.

All wireless transceivers supplied by the manufacturer have the identical address to identify a transmitter and a receiver on wireless communication. Therefore, when using several sets of wireless transceivers within the range of a wireless connection (30 – 100 m), it is necessary to enter unique address into wireless transceivers. And a signal receiver and a signal transmitter from one set must have the same address.

Setting up of wireless transceivers.

All necessary settings can be entered in both parts of a wireless transceiver with the manufacturer's software «RUD Configurator». The interface RS-232 or RS-485 is used to connect devices to a computer. Connecting to a computer can be performed using interface converters USB/RS-232, USB/RS-485, supplied by the manufacturer, or using converters from other manufacturers.

2.5 Marking

Marking of wireless transceivers contains the following information:

- trademark or logo of the manufacturer;
- symbol of the product;
- serial number;
- year of manufacture;
- supply voltage.

2.6 Packaging

A set of products is placed in a polyethylene case. A certificate is placed in the same case.

3. INTENDED USE**3.1 Operational restrictions**

Use of the product is allowed under the conditions specified in paragraph «Specifications (operating conditions)».

Do not use the product when the body of any part of a wireless transceiver or an installation cable is damaged.

Do not use products with the parameters of voltage and current outside the range specified in paragraph «Specifications».

3.2 Preparation of the product for use

Preparation of wireless transceivers for use is required if you want to change the settings entered by the manufacturer. Changing the settings of wireless transceivers is made with the program «RUD Configurator». Connecting of two parts of the wireless transceiver to a computer is made according to one of the diagrams shown in Appendix 2.

Configuration imposed by the manufacturer	
Address of <u>identification of wireless devices</u> (radio address)	0
Time of frequency measurement at the radio signal transmitter input	4 sec.
Speed of data transmission via RS-232 (RS-485)	19200 bps
Mode of frequency measurement input (Input «F»)	Frequency measurement

3.3 Use of the product

- Connect a fuel level sensor to a radio signal transmitter according to one of the diagrams shown in Appendix 3.
- Apply voltage to the radio signal transmitter.
- Connect a radio signal receiver to an external device according to one of the diagrams shown in Appendix 4.
- Apply voltage to the radio signal receiver.
- The product is ready for use.

4. MAINTENANCE

The product does not require any maintenance.

5. ROUTINE REPAIRS

Repairs can be carried out by the manufacturer or third-party organizations that have permission from the company **Centronix**.

6. MANUFACTURER'S WARRANTY

The warranty period is 12 months from the date of shipment to the customer (the guarantee period is set by the manufacturer) under adherence to the operating conditions.

The warranty does not apply to products with mechanical damage and products with traces of self-repairs.

Appendix 1

(Exterior view of wireless transceiver parts)



Figure 1. Exterior view of wireless transceiver parts.

Appendix 2

(Connecting of wireless transceiver parts to a computer for tuning)

Marking of installation cables.

Power wires, inputs and outputs of the device are color-coded. Wires of digital interfaces are digitally signed. Marker is designed as a ring width of 1.5-2mm. Quantity of rings corresponds to the number of the wire.

Marking	Cables' purpose			
	Transmitter RUD-DF-232	Receiver RUD-DF-232	Transmitter RUD-DF-485	Receiver RUD-DF-485
Blue	Power «+»	Power «+»	Power «+»	Power «+»
Black	Power «-»	Power «-»	Power «-»	Power «-»
White	Input «F»	OUTPUT «F»	Input «F»	OUTPUT «F»
White #1	RX	RX	B	B
White #2	TX	TX	A	A

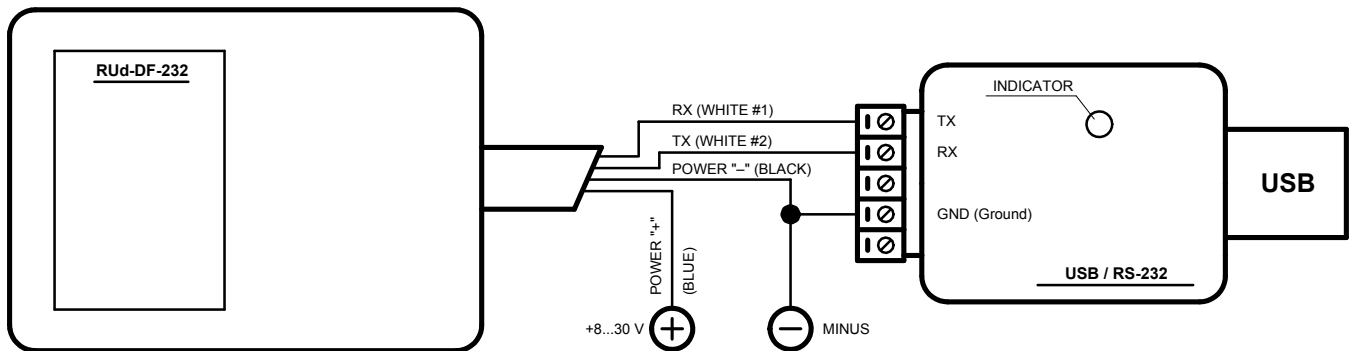


Figure 2. The diagram of connecting RUD-DF-232 parts to a computer for tuning.

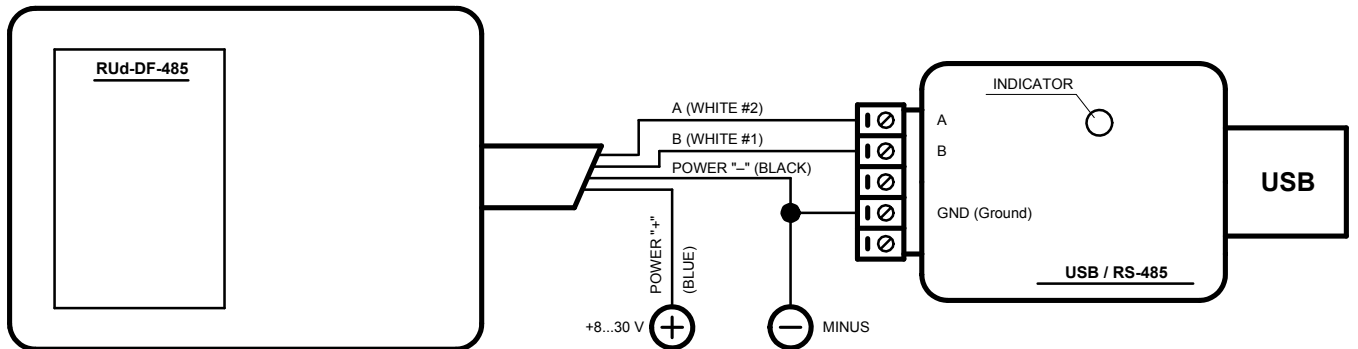


Figure 3. The diagram of connecting RUD-DF-485 parts to a computer for tuning.

APPENDIX 3

(Connecting of wireless transceiver parts to sensors and to an external device)

Marking of installation cables.

Power wires, inputs and outputs of the device are color-coded. Wires of digital interfaces are digitally signed. Marker is designed as a ring width of 1.5-2mm. The quantity of rings corresponds to the number of the wire.

Marking	Cables' purpose			
	Transmitter RUd-DF-232	Receiver RUd-DF-232	Transmitter RUd-DF-485	Receiver RUd-DF-485
Blue	Power «+»	Power «+»	Power «+»	Power «+»
Black	Power «-»	Power «-»	Power «-»	Power «-»
White	Input «F»	OUTPUT «F»	Input «F»	OUTPUT «F»
White # 1	RX	RX	B	B
White # 2	TX	TX	A	A

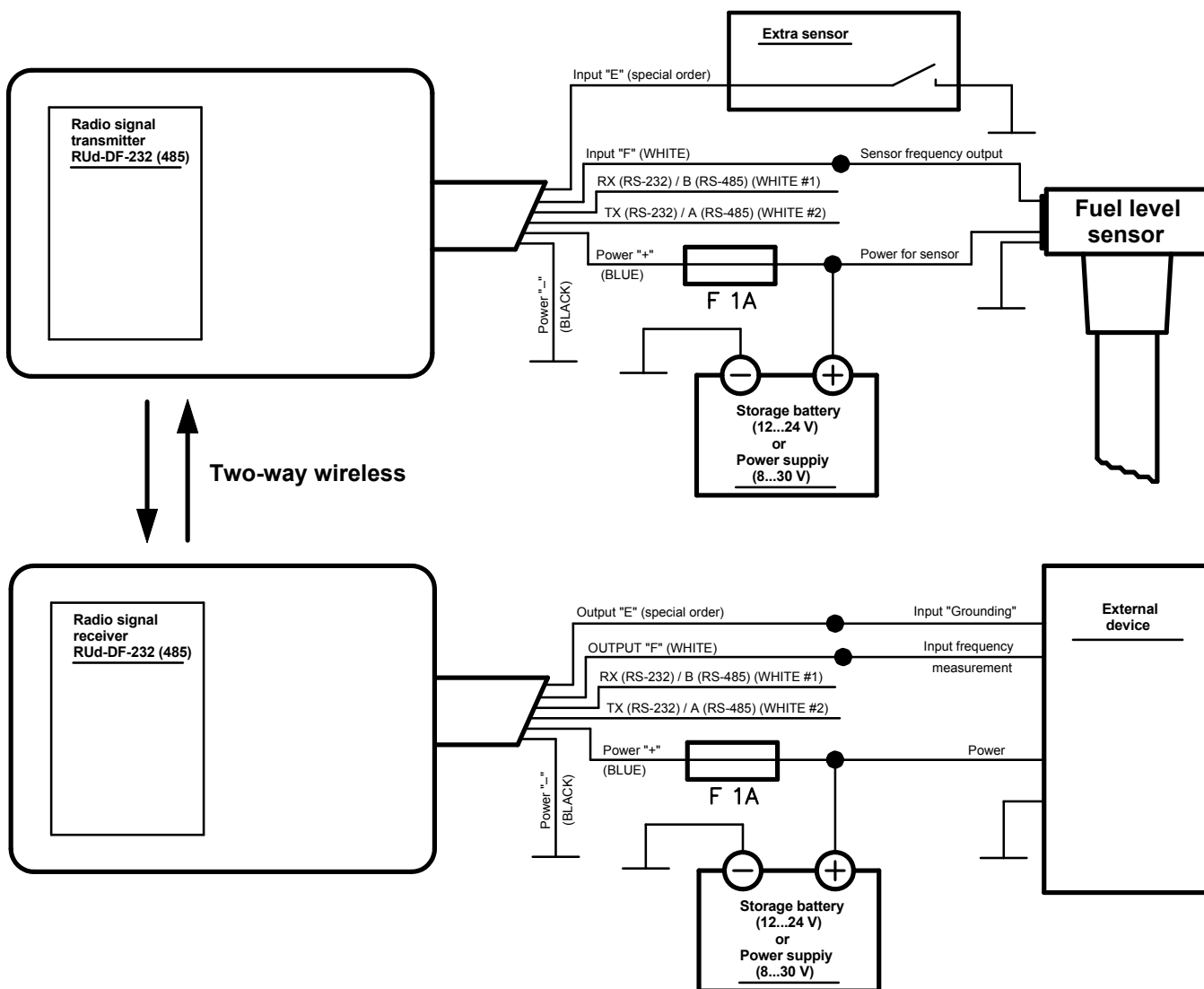


Figure 4. A typical connection diagram of wireless transceivers RUd-DF-232 и RUd-DF-485 for work with a fuel level sensor having a frequency output and with an extra sensor.

Appendix 3 (Continued)

(Connecting of wireless transceiver parts to sensors and to an external device)

Marking of installation cables.

Power wires, inputs and outputs of the device are color-coded. Wires of digital interfaces are digitally signed. Marker is designed as a ring width of 1.5-2mm. The quantity of rings corresponds to the number of the wire.

Marking	Cables' purpose			
	Transmitter RUd-DF-232	Receiver RUd-DF-232	Transmitter RUd-DF-485	Receiver RUd-DF-485
Blue	Power «+»	Power «+»	Power «+»	Power «+»
Black	Power «-»	Power «-»	Power «-»	Power «-»
White	Input «F»	OUTPUT «F»	Input «F»	OUTPUT «F»
White #1	RX	RX	B	B
White #2	TX	TX	A	A

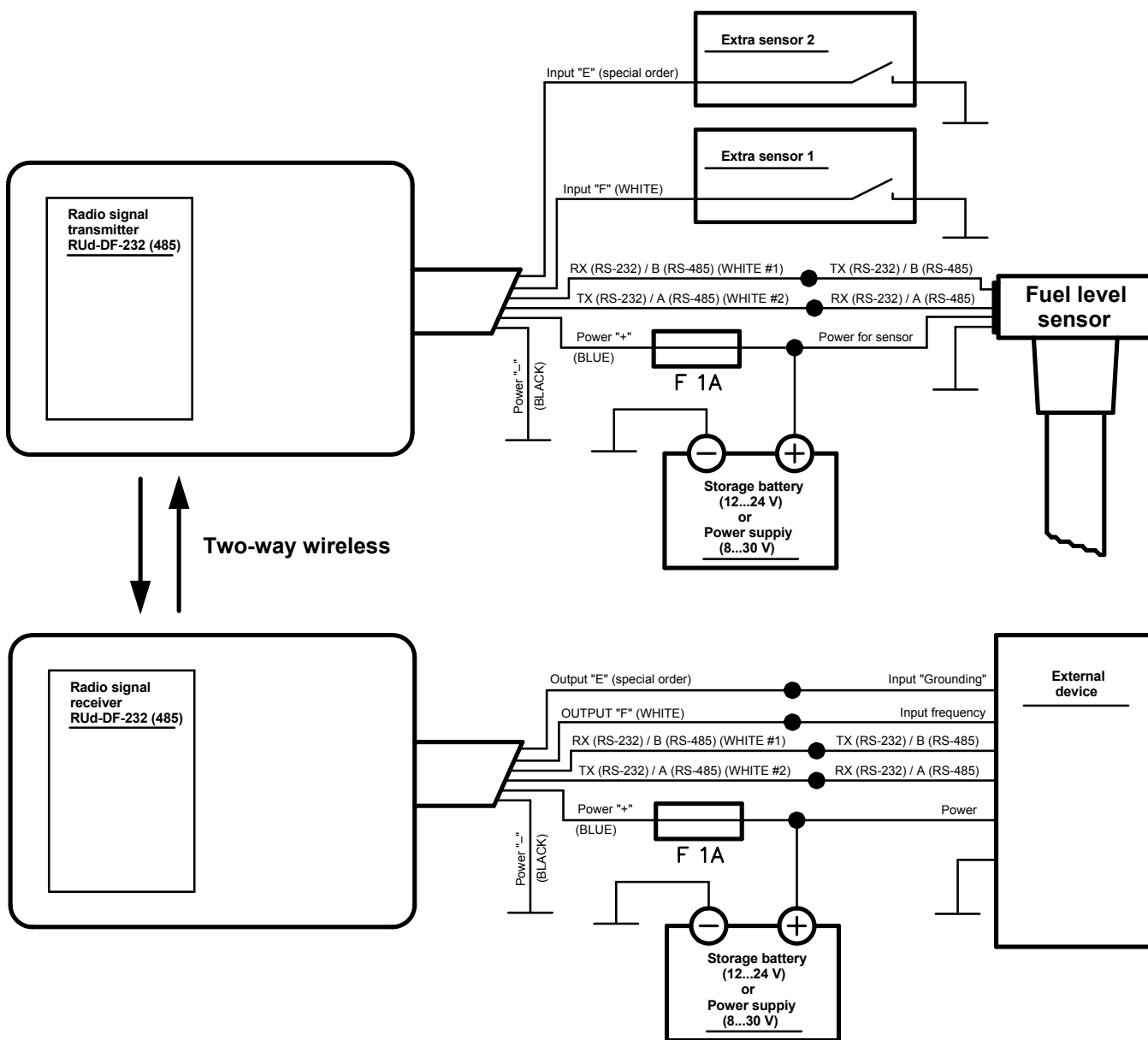


Figure 5. A typical connection diagram of wireless transceivers RUd-DF-232 и RUd-DF-485 for work with a fuel level sensor having a frequency output and with an extra sensor.